The relationship between resourceful working conditions, work-related and general sense of coherence

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The relationship between resourceful working conditions, work-related and general sense of coherence

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SUMMARY

Sense of coherence (SoC) has been identified as an important health resource and is associated with various health-related outcomes, especially perceived health and mental health. SoC has also been found to be relevant in the work context. Our study examined whether job resources, such as autonomy or social support, can contribute to the development of SoC. We also examined the role of the setting-specific work-related sense of coherence (Work-SoC) as well as reciprocal relationships between the three variables. 941 participants from Germany, Switzerland and Austria completed our questionnaires at three waves of data collection. Structural equation modeling was used to identify the best fitting model and interpret the relationships between variables. Our first hypothesis that job resources predict Work-SoC and that Work-SoC predicts SoC was confirmed. We also found support for our second hypothesis that SoC predicts Work-SoC and that Work-SoC predicts job resources. The indirect effects through Work-SoC were only marginally significant in both directions. Our findings illustrate complex and multidirectional relationships between the variables. Job resources seem to contribute to the strengthening of Work-SoC, which seems to set in motion a gain cycle of improved job resources, which again contribute to a higher Work-SoC. Over time, this might contribute to strengthening general SoC. However, our findings showed that SoC was highly stable over the observed 3-months interval, limiting the effect any other variable could exert on it. Future research should further examine the mechanisms and timeframes over which a setting-specific SoC contributes to the development of overall SoC.

Key words: employee, salutogenesis, structural equation modeling, worksite

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INTRODUCTION

In 1979, Aaron Antonovsky presented the concept of salutogenesis as a complement to the commonly used pathogenic model. He viewed health as something that is not created by the elimination of all relevant risk factors, but rather can be maintained and enhanced by strengthening individuals' resources and in particular their sense of coherence (SoC). SoC reflects to what extent individuals experience their life as comprehensible, manageable and meaningful and is now considered an important health resource. Numerous studies have demonstrated a main, moderating or mediating effect of SoC on health (Eriksson and Lindström, 2006). Sustaining and building SoC thus presents a promising approach to improving health, and salutogenesis has been put forward as a framework to guide health promotion (Antonovsky, 1996; Eriksson and Lindström, 2008, Mittelmark *et al*., 2017). Studies have demonstrated that SoC can be affected by experiences in different life domains, including work experiences (Feldt *et al.*, 2000), albeit predominantly with cross-sectional research designs. Meanwhile, the domain-specific work-related sense of coherence (Work-SoC) has been specified and has been found to be associated with motivational and health-related work outcomes such as work engagement and exhaustion (Bauer *et al*., 2015). With this study we want to conduct the first longitudinal investigation of the relationship between job resources, Work-SoC and SoC to help illuminate the potential of working conditions to contribute to the strengthening of SoC and the health and wellbeing accompanying it.

Sense of Coherence

Antonovsky defined SoC as "a global orientation that expresses the extent to which one has a pervasive, enduring though dynamic feeling of confidence that (1) the stimuli, deriving from one's internal and external environments in the course of living are structured, predictable and explicable; (2) the resources are available to one to meet the demands posed by these stimuli; and (3) these demands are challenges, worthy of investment and engagement" (Antonovsky, 1987, p. 19). This definition reflects the three dimensions of the SoC, comprehensibility, manageability and meaningfulness and highlights the interaction between the individual and the environment. Antonovsky theorized that SoC develops over time in childhood and adolescence as the individual uses general resistance resources - for example knowledge, money or social

support - to deal with demands. He considered three aspects to be particularly relevant in this context: consistency, load balance and participation in shaping outcomes. The fourth aspect – emotional closeness – was later added by Sagy and Antonosvky (2000). Interventions focused on strengthening these aspects have shown an increase in SoC (Kahonen *et al*., 2012). Antonovsky originally expected SoC to stabilize in early adulthood, but later proposed that SoC can be further influenced by life experiences, including the working environment (Antonovsky, 1979). These assumptions have also found empirical support. Besides childhood living conditions, relationship with partner, social support and quality of work are also associated with stronger SoC (Volanen *et al*., 2004), whereas a decrease in health status and social support have been found to contribute to lower SoC (Nilsson *et al*., 2003).

The relationship between sense of coherence and health

Strong SoC has been associated with a range of health-related outcomes. In a systematic review of 471 quantitative, qualitative, cross-sectional and longitudinal studies, Eriksson and Lindström (2006) found that SoC had a main, moderating and mediating effect on health. It was particularly related to perceived health and mental health and numerous studies found a negative relationship between SoC and depression. The associations with physical health were weaker and more varied, for example, a large prospective study found SoC to be related to lower incidences in coronary heart disease in white collar workers, while no such relationship was found among blue collar workers (Poppius *et al*., 1999). Similarly, Flensborg and colleagues' (2005) review of 50 scientific publications found that SoC was strongly related to psychological aspects, in particular stress and behavioral health aspects, while relationships between SoC and physical health were more modest. Surtees *et al*. (2003) on the other hand, in a prospective cohort study with more than twenty thousand participants, found 24% reduced all-cause mortality in persons with high SoC, even after controlling for confounders such as socio-economic status, body-mass index, smoking, blood pressure and cholesterol.

Sense of coherence in the context of work

Numerous studies have investigated SoC in the context of work. A study by Feldt (1997) with 989 technical designers found that those with higher SoC experienced fewer psychosomatic symptoms and less emotional exhaustion. Furthermore, strong SoC seemed to buffer against the

effects of adverse working conditions. Strong SoC has also been linked to lower rates of burnout (Kalimo *et al.*, 2003) and higher levels of work engagement (Van der Colff and Rothmann, 2009; Vogt *et. al.*, 2016). Other studies have examined SoC as a mediator in the relationship between organizational variables and health-related and motivational outcomes. SoC was found to mediate the relationship between psychosocial working environment and stress (Albertsen *et al.*, 2001) and between the experience of workplace violence and stress (Hogh and Mikkelsen, 2005).

Job resources are acknowledged to be an important contributor to health, both according to the salutogenic model and the job demands resources (JD-R) Model (Demerouti *et al*., 2001). The JD-R model defines job resources as "those physical, psychological, social, or organizational aspects of the job that may do any of the following: (a) be functional in achieving work goals; (b) reduce job demands and the associated physical and psychological costs; (c) stimulate growth and development." (Demerouti *et al*., 2001, p. 501). The motivational process of the JD-R model links the presence of such job resources to increased work motivation and performance (Bakker *et al*., 2007). In the salutogenic model, job resources can be viewed as part of the generalized resistance resources and Jenny *et al.* (2017) propose that job resources contribute to the development of SoC through coherent work experiences. The salutogenic model also points to reciprocal processes, suggesting that strong SoC, including the good health associated with it, allows the individual to maintain and enhance future resources. This thinking is in line with the broaden-and-build theory by Fredrickson (2001), which states that positive emotional states broaden an individual's behavioral repertoire which over time allows them to build more personal resources. This way SoC, as a positive emotional state, may support the accrual of more job resources over time. Likewise, the conservation of resource theory (Hobfoll, 1989) suggests that individuals with higher resources are set up for further resource gain. The longitudinal study by Vogt *et al*. (2016) found reciprocal relationships between job resources and SoC which lends support to these assumptions.

Work-related sense of coherence

Findings that coherent life experiences in different settings can affect SoC (Carmel and Bernstein, 1990; Feldt *et al*., 2000), have stimulated the research into setting-specific SoCs (for example Antonovsky and Sourani, 1988; Artinian, 1997; Gräser, 2003). In 2007, Bauer and

Jenny proposed the work-related sense of coherence, Work-SoC. In parallel with Antonovsky's original definition, they defined it as the perceived comprehensibility, manageability and meaningfulness of an individual's current work situation. Bauer and Jenny (2007) propose that Work-SoC is closer in time and concept to the working situation than general SoC and also better suited to, for example, tracking the effects of organizational interventions. Studies have found that Work-SoC is positively correlated with job resources and negatively with job demands (Vogt *et al*., 2013). Work-SoC was also found to be positively associated with work engagement, affective commitment and enthusiasm at work, while it was negatively associated with sleep problems, exhaustion and psychosomatic complaints (Bauer *et al.*, 2015). Work-SoC also predicted work engagement in a longitudinal study at 1-year intervals (Grødal *et al*., 2019). For the purposes of this study, we operationalize coherent work experiences as Work-SoC.

Research Questions and Hypotheses

The aim of this study is to explore whether job resources contribute to the development of SoC. We are particularly interested in understanding whether the relationship between these two variables is reciprocal and whether an effect of job resources onto SoC occurs through Work-SoC. Our first research question concerns the effects of job resources on SoC through Work-SoC. Both Work-SoC and SoC have been identified as mediators in the relationship between job resources and work engagement (Vogt *et al.*, 2013, 2016), indicating that job resources contribute to the development of both Work-SoC and SoC. Van der Westhuizen's (2018) finding that Work-SoC explained incremental variance over and above SoC in the relationship between job demands and adverse health outcomes supports Bauer and Jenny's (2007) conceptualization of Work-SoC as a construct that is more directly affected by working conditions than SoC. We can assume a comparable mechanism to be at play for job resources, expecting that job resources contribute to the development of SoC and Work-SoC and that the effect on the latter would be more pronounced.

This influence of job resources may unfold via two different processes: On the one hand, they may directly support growth and development which is associated with stronger SoC. On the other hand, job resources like autonomy at work or peer support may yield an indirect effect by being instrumental in dealing with workplace challenges and contributing to their successful

resolution. This then affects the perceived comprehensibility, manageability and meaningfulness of one's working situation - the Work-SoC - which, in conjunction with experiences in other life domains, forms a person's overall SoC (Jenny *et al.*, 2017). Similar mechanisms have been described by Super *et al*. (2015). The longitudinal relationship between Work-SoC and SoC remains to be examined. Based on the previous empirical findings, the conceptualization of Work-SoC (Bauer and Jenny, 2007) and the theoretical assumptions of the salutogenic model (Jenny *et al.*, 2017), we expect that:

Hypothesis 1a: Job resources at T1 have a positive, cross-lagged effect on Work-SoC at T2 and, similarly, from T2 to T3

Hypothesis 1b: Work-SoC at T1 has a positive, cross-lagged effect on SoC at T2 and, similarly, from T2 to T3

Hypothesis 1c: Job Resources at T1 have an indirect effect on SoC at T3 via Work-SoC at T2

Our second research question addresses the reversal relationships between the three study variables. The salutogenic model and findings related to gain spirals point towards reciprocal processes and suggest that a stronger SoC may contribute to higher levels of job resources through the actual possession of more resources and also the increased perception as well as the inclination to put them to good use (Eriksson and Lindstrom, 2006). Applied to the work context, this could mean that people who experience their work as more comprehensible, manageable and meaningful may be better able to understand the workplace stressors and to identify resources that allow them to deal with them. Initial empirical support relating to our study variables found that SoC predicted job resources in a longitudinal analysis (Vogt *et al.*, 2016). Thus, we expect that:

Hypothesis 2a: SoC at T1 has a positive, cross-lagged effect on Work-SoC at T2 and, similarly, from T2 to T3

Hypothesis 2b: Work-SoC at T1 has a positive, cross-lagged effect on job resources at T2 and, similarly, from T2 to T3

Hypothesis 2c: SoC at T1 has an indirect effect on job resources at T3 via Work-SoC at T2

METHOD

Participants and Procedure

We conducted a three-wave study with three-month intervals. No ethical review was necessary under federal, regional, university or departmental rules. The study was conducted under strict observation of ethical and professional guidelines. Participants in Germany, Austria, Switzerland working in a wide range of occupations were recruited through an online panel service. Inclusion criteria were being between 18 and 65 years of age, holding an employed job and working at least 20 hours per week. While the use of online panel services remains controversial, a recent meta-analysis compared the patterns between variables in online panel samples and traditional samples and found them to be comparable (Walter *et al*., 2019).

To best assess the longitudinal relationship between variables, we included only respondents who participated in all three waves of data collection. 1852 respondents completed the questionnaire at the first administration (T1), 1229 of whom also completed the questionnaire at the second wave (T2) of data collection (66%). Of these, 995 persons (81%) responded also at the third wave (T3). We excluded 54 participants from our analyses due to unengaged responses and our final sample comprised of 941 respondents. Our sample was the same as used by Vogt *et al.* (2016), albeit analyzing a different set of variables and using slightly different inclusion and exclusion criteria.

53.2% of the participants lived in Germany, 32.4% in Austria and 14% in Switzerland. The mean age was 41.147 (SD = 9.097) and 62.2 percent of our participants were male. 39.1% replied that they had completed a vocational training and 34.2% held a degree from an institute of higher education. The largest employment sector among participants was public services and administration (11.9%), followed by health and social services (10.5%). 8.2 percent worked in trade, 8.2 percent in information and communication and 8.1 percent in manufacturing. Various other industries were represented to smaller degrees. 26 percent of participants reported having

leadership responsibilities and 5 percent worked in an executive role, while 69 percent did not have any leadership responsibilities.

Regression analysis to determine selective dropout (Goodman and Blum, 1996) found that neither job resources (β = -.049; SE = .082; p = .550), Work-SoC (β = .010; SE = .047; p = .825) nor SoC (β = -.007; SE = .042; p = .863) at T1 significantly predicted study participation at T3. However, those who completed all three waves tended to be older (41.147 years versus 38.144 years; t(1692.954059) = -6.589845, p < .001) and were more likely to be male (62.2% vs. 50.5%; (χ^2(1) = 25.565, p < .001).

Measures

All measures validated in languages other than German were translated into German and checked for accuracy, using the back-translation procedure. Since the internal reliability was similar across the three measurement points for all variables, we report only Cronbach's alphas for T1 below.

Job Resources

We assessed four job resources using scales developed by the United Kingdom Health and Safety Executive (Cousins *et al.*, 2004): *control* (six items such as "I have a say in my own work speed", α T1 = .816), *role* (five items such as "I am clear about the goals and objectives for my department", α T1 = .848), *support from colleagues* (four items such as "If the work gets difficult, my colleagues will help me", α T1 = .836), and *support from supervisor* (five items such as "I am given supportive feedback on the work I do", α T1 = .917). The fifth resource, *variety and possibilities for development* was assessed using six items from two scales of the Salutogenic Subjective Work Analysis Questionnaire (Richter *et al.*, 2006; Udris and Rimann, 1999). Items include "There is something different to do almost every day" or "New things can always be learned in this work". One of the original items was rephrased in order to better capture the underlying concept of job resources, "With this work, I lose many abilities that I had before" was changed to "With this work, I can develop my abilities." We performed an exploratory factor analysis with Eigenvalues >1 and found that all six items at T1 loaded onto a

single factor which explained 64.46% of the variance. Cronbach's α at T1 was .887. All job resources were rated by the participants on five-point scales.

Work-SoC

Work-SoC was assessed using the Work-SoC Scale (Vogt *et al.*, 2013; Bauer *et al.*, 2015). Participants answered nine items regarding their current and general work situation on a seven-point scale with pairs of adjectives. Four items measured the subdimension of comprehensibility (e.g. *predictable-unpredictable*). The subdimension of manageability was assessed with two items (e.g. *controllable-uncontrollable*, both reverse-scored) and the subdimension of meaningfulness with three items (e.g. *unrewarding-rewarding*). Cronbach's α for participants at T1 was .884.

SoC

SoC was assessed with the SOC-L9 scale (Schumacher *et al.*, 2000). Participants responded to the items on a seven-point scale and Cronbach's alpha for participants at T1 was .901. While the SOC-L9 was developed as a one-dimensional scale, it contains items reflecting the three theoretical components of sense of coherence, comprehensibility *(*e.g. "Do you have the feeling that you are in an unfamiliar situation and don't know what to do?" with response options ranging from *very often* to *very seldom or never)*, manageability (e.g. "When you think of difficulties you are likely to face in important aspects of your life, do you have the feeling that . . ." with response options ranging from *You will always succeed in overcoming the difficulties* to *You won't succeed in overcoming the difficulties*), and meaningfulness *(e.g. "Doing the things you do every day is . . ."; responses range from A source of deep pleasure and satisfaction to A source of pain and boredom).* A confirmatory factor analysis of SoC at T1 with these three sub-dimensions showed good fit (CFI = .983, NFI = .978, RMSEA = .056).

Statistical Analyses

We performed structural equation modeling (SEM) of our three study variables in AMOS version 22 (Arbuckle, 2013) with the maximum likelihood estimation procedure. We built the models using latent variables, indicated by the mean scores of their respective subscales. The use

of such parcels supports a better representation of the true score by cancelling out random errors and item-specific components. A potential downside of parceling relates to multidimensionality and model misspecification (Matsunaga, 2008). However, this risk should be mitigated by using unidimensional scales as parcels, as was done in our analysis. To evaluate model fit, we used the RMSEA as an absolute indicator of goodness of fit as well as the CFI and NFI as relative fit indicators with the conventional cut-off values (i.e. RMSEA < .08; CFI < .95; NFI < .95; TLI < .95; Schermelleh-Engel *et al*., 2003). Differences in model fit were assessed based on the chi-square difference test for nested models and the AIC. Indirect effects were assessed using bootstrap procedures (Hayes, 2009).

RESULTS

Table 1 illustrates the descriptive statistics and correlations of our study variables. Test-retest correlations ranged from .713 to .842, indicating high stability of all three constructs. Correlations between variables were all in the expected direction and ranged from .438 for the relationship between job resources at T1 and SoC at T3 to .622 for the relationship between job resources at T2 and Work-SoC at T2.

Table 1: Means, standard deviations and correlations between study variables for the three measurement points T1, T2 and T3

	M	SD	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. JR T1	3.648	0.582	1	.812	.759	.598	.556	.463	.493	.461	.438
2. JR T2	3.583	0.602	.812	1	.802	.538	.622	.519	.446	.474	.448
3. JR T3	3.575	0.585	.759	.802	1	.541	.553	.620	.471	.483	.511
4. Work-SoC T1	4.990	1.006	.598	.538	.541	1	.766	.713	.526	.494	.483
5. Work-SoC T2	4.905	1.035	.556	.622	.553	.766	1	.735	.462	.525	.478
6. Work-SoC T3	4.887	1.026	.463	.519	.620	.713	.735	1	.469	.506	.542
7. SOC T1	5.048	1.137	.493	.446	.471	.526	.462	.469	1	.818	.806
8. SOC T2	5.031	1.157	.461	.474	.483	.494	.525	.506	.818	1	.842
9. SOC T3	5.044	1.167	.438	.448	.511	.483	.478	.542	.806	.842	1

Notes: All correlations were statistically significant at $p < .01$
JR = Job resources, Work-SoC = Work-related sense of coherence, SoC = Sense of coherence

Measurement Invariance

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We established configural and metric invariance before comparing models specifying different structural relationships between the three variables (Newsom, 2015). We explored the fit of the measurement model 0a by performing a longitudinal confirmatory factor analysis. This model 0a showed good model fit and did not significantly differ from model 0b which specified equal factor loadings of each indicator across the three measurement points.

Model Comparison

We proceeded by comparing four different structural models, which are illustrated in Figure 1. The stability model 1 represents the most basic longitudinal model, specifying only autoregressive paths for each latent variable over time. The causal model 2 added to the autoregressive paths the cross-lagged paths from job resources to Work-SoC and from Work-SoC to SoC. The reversal model 3 included the autoregressive paths as well as cross-lagged paths from SoC to Work-SoC and from Work-SoC to job resources. The reciprocal model 4 specified autoregressive paths as well as paths leading from job resources to Work-SoC, from Work-SoC to SoC, from SoC to Work-SoC and from Work-SoC to job resources. In all models, the exogenous variables were allowed to covary at T1 and the residuals of the endogenous variables were allowed to covary at T2 and at T3, respectively. Errors of the same indicators were also allowed to covary over time.

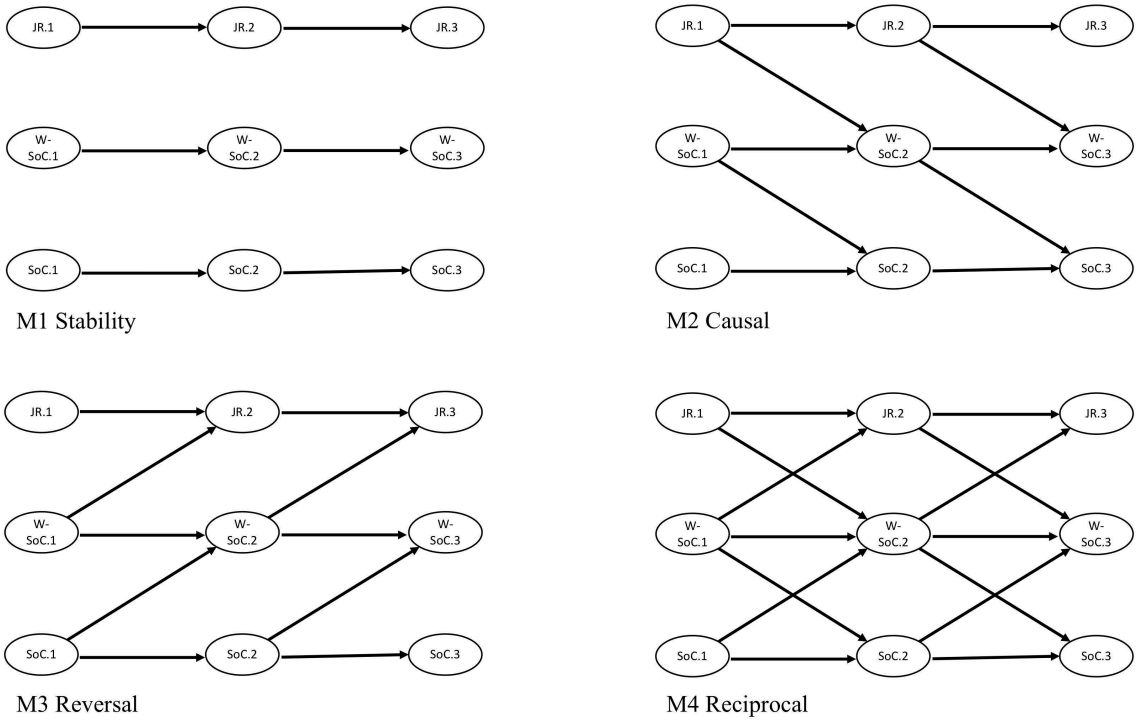

Figure 1: The four competing models of the relationships between Job Resources (JR), Work-SoC and SoC
.1 = T1, .2 = T2, .3 = T3

Since time lags between measurements were equal in length, it can be assumed that the regression paths are equal between time lags (Finkel, 1995). We tested for time invariance whenever adding additional paths to our model. In all cases, the fit of the models b with imposed equality constraints did not differ significantly from models a without those, indicating that the regression paths for the time lags were time invariant. Table 2 illustrates the results of time invariance testing and nested model comparison.

Table 2: Fit statistics for the study models

Model	Model fit	Model comparison*	Chi square difference (df)
0a (measurement model)	$\chi 2(426) = 1473.166$***, CFI = .959, NFI = .943, RMSEA = .051, AIC = 1743.166		
0b (measurement model, equal factor loadings)	$\chi 2(442) = 1485.570$,*** CFI = .959, NFI = .942, RMSEA = .050, AIC = 1723.570	0a vs. **0b**	$\Delta\chi 2(16) = 12.404$, p = 0.716
1a (stability)	$\chi 2(463) = 1644.199$***, CFI =		

	.953, NFI = .936, RMSEA = .052, AIC = 1840.199		
1b (stability, time invariance)	$\chi2(466) = 1649.602$***, CFI = .953, NFI = .936, RMSEA = .052, AIC = 1839.602	1a vs. **1b**	$\Delta\chi2(3) = 5.403$, $p = 0.145$
2a (causal)	$\chi2(462) = 1631.462$***, CFI = .954, NFI = .937, RMSEA = .052, AIC = 1829.462		
2b (causal, time invariance)	$\chi2(464) = 1633.078$***, CFI = .954, NFI = .937, RMSEA = .052, AIC = 1827.078	2a vs. **2b**	$\Delta\chi2(2) = 1.616$, $p = .446$
		1b vs. **2b**	$\Delta\chi2(2) = 16.524$, $p < .001$
3a (reversal)	$\chi2(462) = 1620.377$***, CFI = .954, NFI = .937, RMSEA = .052, AIC = 1818.377		
3b (reversal, time invariance)	$\chi2(464) = 1620.841$***, CFI = .954, NFI = .937, RMSEA = .052, AIC = 1814.841	3a vs. **3b**	$\Delta\chi2(2) = 0.464$, $p = .793$
		1b vs. **3b**	$\Delta\chi2(2) = 28.761$, $p < .001$
4b (reciprocal, time invariance)	$\chi2(462) = 1609.611$***, CFI = .955, NFI = .938, RMSEA = .051, AIC = 1807.611		
		1b vs. **4b**	$\Delta\chi2(4)=39.991$, $p < .001$
		2b vs. **4b**	$\Delta\chi2(2) = 23.467$, $p < .0001$
		3b vs. **4b**	$\Delta\chi2(2) = 11.23$, $p = .004$

*** $p < .001$

Note: *Superior models are printed in bold

Model 4b was found to be superior to the other models and showed good model fit, indicating that the assumption of reciprocal relationships between the study variables and an interceding role of Work-SoC was best aligned with our data. Figure 2 illustrates these relationships. As can be seen, all causal and reversal relationships were significant, thus confirming hypotheses 1a, 1b, 2a, and 2b.

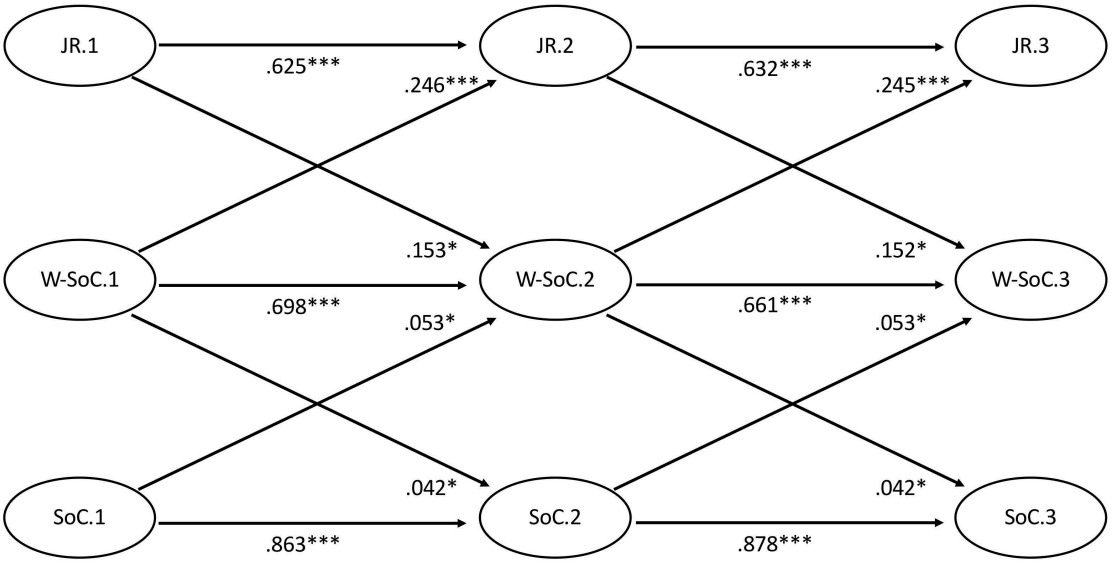

Figure 2: The final model (4b) of the relationships between Job Resources (JR), Work-SoC and SoC
.1 = T1, .2 = T2, .3 = T3
* p < .05, ** p < .01, *** p < .001

We further examined an indirect effect through Work-SoC with bootstrapping procedures using 5000 bootstrap samples and bias-corrected confidence intervals of .90. In line with our hypothesis 1c, the effect of job resources at T1 onto SoC at T3 through Work-SoC at T2 was found to be significant (β = .006, SE = .008, CI = .001-.027), as was the indirect effect of SoC at T1 onto job resources at T3 through Work-SoC at T2 (β = .013, SE = .021, CI = .001-.062), confirming hypothesis 2c. In both cases, however, the indirect effects were only very marginally significant and small in magnitude.

DISCUSSION

This study explored the longitudinal relationship between job resources, Work-SoC and SoC. All components of our first hypothesis were confirmed. Job resources had a cross-lagged effect on Work-SoC (hypothesis 1a) and Work-SoC had a cross-lagged effect on SoC (hypothesis 1b). Hypothesis 1c, which specified that job resources have an indirect effect on SoC through Work-SoC, was marginally significant. We found a comparable pattern regarding our

second hypothesis, with the anticipated cross-lagged effects of SoC on Work-SoC (hypothesis 2a) and of Work-SoC on job resources (hypothesis 2b). The indirect effect of SoC on job resources through Work-SoC was again marginally significant (hypothesis 2c). Our findings illustrate complex and multidirectional relationships between the study variables which can be grouped into four themes:

Relationships between Job Resources and Work-SoC

The cross-lagged effect of job resources on Work-SoC found in our study extends the findings by Vogt *et al*. (2013), who reported substantial correlations between these two variables across measurement points and illustrates that job resources and Work-SoC are in fact causally related. Even more pronounced was the effect that Work-SoC had on job resources, which indicates that job resources are not merely passively experienced by working individuals, but rather actively co-created via a strong Work-SoC. This may occur through two processes. A stronger Work-SoC may support individuals in actively creating new job resources and it may also lead them to evaluate their existing resources differently, both of which could set in motion an upward spiral. This dual effect of Work-SoC on of job resources may account for the greater magnitude of the effect in this direction. Another possible explanation for the less pronounced effect of job resources on Work-SoC lies in that job resources only capture part of the relevant workplace attitudes and we can assume that the inclusion of both job resources and demands, which have been found to fluctuate more strongly (Brauchli *et al*., 2013), would lead to a stronger effect working conditions on Work-SoC.

Relationships between Work-SoC and SoC

We found significant but weak cross-lagged relationships between Work-SoC and SoC. One reason for the weak effect of Work-SoC on SoC could lie in the very high degree of stability of SoC we saw in our study, diminishing the influence any other variable was able to exert on it, and the relatively short time lag between our waves of data collection could have amplified this issue. Previous studies have shown that test-retest correlations for SoC decrease with longer time intervals from approximately .9 after one week (Frenz *et al*., 1993) to .70 after six to twelve months (Feldt *et al*., 2000; Schnyder *et al*., 2000) and .67 after three years (Feldt *et al*., 2004). Additionally, SoC, as a setting-unspecific construct, can also be expected to be influenced by

experiences in many other life domains. While Antonovsky did allude to the potential of work influencing SoC, many other life areas contribute to SoC as well, such as family relationships, connection to community, quality of living situation, health or personality (Idan et al., 2017). Combined, these factors may have made an effect of work attributes on SoC over a 3-months interval difficult to detect.

Indirect effects through Work-SoC

Our study found an indirect effect of job resources on SoC and of SoC on job resources through Work-SoC, although both the causal and reversal paths were only marginally significant. We attribute this finding primarily to the high stability of the involved constructs. A high stable component of job resources had previously been demonstrated by Brauchli *et al*. (2013), who assessed it at 48 to 69 percent at 1-year intervals. Other studies have found conflicting evidence regarding the longitudinal relationships between job resources and SoC. Togari and Yamazaki (2012) found that work environment significantly predicted SoC one year later, but that no bidirectional relationship existed. Feldt *et al*. (2004), on the other hand, found no effect of work characteristics on SoC, but found that SoC predicted organizational climate at three-year follow-up, but not organizational control. The small yet marginally significant effects of job resources on SoC through Work-SoC and vice versa suggest that Work-SoC does play some role in the relationship between job resources and SoC. However, as SoC is influenced by many different life domains beyond the immediate work setting, evidently its interplay with job resources and Work-SoC is limited.

Work-SoC as an interactional construct

Lastly, our findings shine further light on the construct of Work-SoC itself. Bauer and Jenny (2007) have presented Work-SoC as an interactional construct, influenced by aspects of the current working situation on the one hand and by attributes of the individual on the other. The influence of the working situation had already been confirmed by Vogt *et al*. (2013) with cross-sectional data. Our study was the first to analyze both sets of variables with longitudinal data. The effect of job resources onto Work-SoC was, however, more pronounced than the effect of SoC and suggests that the Work-SoC scale could be potentially serve as an indicator of employees' perception of the resourcefulness of their working situation. Further support for this

proposition comes from Westhuizen's (2018) finding that Work-SoC explains incremental variance above and beyond SoC in work wellness.

Strengths and Limitations

Our study was the first to analyze the three variables job resources, Work-SoC and SoC with longitudinal data. The broad sample comprising working adults from three different European countries, of a wide age range and working in numerous industries with and without leadership responsibilities, contribute to the generalizability of our findings. There are, however, some limitations to be considered. All variables in our study were assessed using self-reported data, which carries the risk of common method variance. Still, no other means of data collection appear suitable to capture Work-SoC and SoC, both of which revolve around the concept of "sense", which, by its very nature, is highly subjective. Job resources could, to some extent, benefit from the use of more objective measurement tools, however, not merely the quantifiable extent of job resources should be relevant, but also their perception by the individual. This also varies depending on the situation and previous studies have shown that the salience of job resources increases in the presence of high job demands (Bakker *et al*., 2003).

Our drop-out analysis found that male and older participants were more likely to participate in all three waves of data collection. While we do not have a satisfactory explanation for this occurrence, this may have affected our findings in two ways. Older participants may have a more stable SoC, which could have led to a slight underestimation of the effects of job resources and Work-SoC on SoC. At the same time, a slight overestimation may have occurred as women's SoC may be slightly less affected by work-related aspects such as job resources and Work-SoC if they also carry more child-rearing and home-making responsibilities than men. However, these ideas are purely speculative and would require further examination.

The data collection was spaced three months apart. This may not have constituted the most appropriate time frame to capture the variability of our study variables. Future research should examine the appropriate time frame to capture changes in SoC. In particular, it will be important to examine if, and over what timeframe, other setting-specific SoC constructs contribute to the development of general SoC and how SoC is affected by more substantial changes in work aspects, for example lay-offs or job changes.

Conclusions

In summary, our findings illustrate that job resources contribute to the strengthening of the setting-specific Work-SoC. Its strengthening seems to initiate a gain cycle of improved job resources, which in turn again contribute to a higher Work-SoC. While the mutual relationships between job resources and Work-SoC were pronounced, those between Work-SoC and SoC were not. The nonetheless significant effects of Work-SoC onto SoC suggest that strengthening setting-specific SoC might, over time, still contribute to strengthening general SoC.

Our findings provide organizations with the option of a dual approach. First, the effect of job resources on Work-SoC suggests that providing employees with more resources like support, role clarity or autonomy can be considered instrumental in helping them experience work as more comprehensible, manageable and meaningful. The increased job resources also provide the added benefit of buffering against the potential adverse effects of workplace demands, as posited by the JD-R model (Demerouti et al., 2001). Secondly, they can promote Work-SoC by directly helping employees experience their work as comprehensible, manageable and meaningful, for example through clearer communication. In both instances, the use of Work-SoC as an indicator that is more sensitive to change in the work context is useful for future research and practice.

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